

In the Claims

Claim 1 – 14 (Cancelled)

Claim 15 (Currently amended): A method to control braking and optimize controllability of a vehicle having a generator motor adapted to adjustably apply regenerative braking torque ~~independently~~ to wheels of a first axle and non-regenerative brakes connected to wheels of a second axle, comprising the steps of:

controlling the vehicle by sensing vehicle conditions including at least one of brake position, wheel speed of each wheel, and degree of steering angle deviation right or left of a straight ahead direction;

activating non-regenerative and regenerative braking in varying proportion independently among wheels of said first and second axles;

determining vehicle controllability based on comparison of at least one measured vehicle controllability value against at least one predetermined target value; and

reducing regenerative braking to the wheels of said first axle while increasing the non-regenerative braking to a single selected wheel of said second axle, to maintain the actual vehicle controllability value within the predetermined target value.

Claim 16 (Original): The method of Claim 15, wherein the step of controlling the vehicle comprises using a simple proportional-integral-derivative feedback controller.

Claim 17 (Currently amended): The method of Claim 15, wherein:

wheels on a front axle are steerable;

the generator motor controls regenerative braking torque applied to the wheels on a rear axle;

non-regenerative brakes are connected to the wheels on the front axle;

the step of sensing vehicle conditions further comprises determining lateral acceleration and yaw rate of the vehicle; and

the step of reducing regenerative braking while increasing the non-regenerative braking to one wheel to maintain the actual vehicle controllability value within the predetermined target value comprises the step of increasing proportionally the non-regenerative brake torque applied to a front wheel which travels on an outside of a turn.

Claim 18 (Currently amended): The method of Claim 15, wherein:

the wheels on the front axle are steerable;
the generator motor adjustably controls regenerative braking torque applied to the wheels on a front axle;
non-regenerative brakes are connected to the wheels on a rear axle;
the step of sensing vehicle conditions further comprises the step of determining lateral acceleration and yaw rate of the vehicle; and
the step of reducing regenerative braking while increasing the non-regenerative braking to one wheel to maintain the actual vehicle controllability value within a predetermined target value comprises the step of increasing proportionally the non-regenerative braking torque applied to a rear wheel traveling on an inside of a turn.

Claim 19 (Original): The method of Claim 15, wherein the vehicle controllability determination includes the step of measurement a longitudinal wheel slip ratio value.

Claim 20 (Original): The method of Claim 15, wherein the vehicle controllability determination includes the step of determining and comparing a target and actual vehicle tire slip angle.

Claim 21 (Original): The method of Claim 15, wherein the vehicle controllability determination includes the step of determining and comparing target and actual yaw rate.

Claim 22 (Original): The method of Claim 19, wherein the step of reducing regenerative braking is activated when the longitudinal wheel slip ratio value is greater than 10 percent.

Claim 23 (Original): The method of Claim 19, wherein the step of reducing regenerative braking is activated when the longitudinal wheel slip ratio value is greater than 5 percent.

Claim 24 (Original): The method of Claim 19, wherein the step of reducing regenerative braking is activated when the longitudinal wheel slip ratio value is greater than a value that is dependent on vehicle operating conditions.

Claim 25 (Currently amended): Apparatus for continuously controlling braking and optimizing controllability of a vehicle, comprising:

a generator motor for providing regenerative braking torque to the wheels a first axle;

non-regenerative brakes being connected to the wheels of a second axle;

a controller adapted to operate said generator motor;

regenerative braking and non-regenerative braking being independently adjustably applied to wheels of said first and second axles; and

a control system embodied in the controller for directing the controller to sense vehicle conditions including brake position, wheel speed of each wheel, and degree of steering angle deviation right or left of a straight ahead orientation,

said control system being adapted to activate non-regenerative and regenerative braking in varying proportion independently among the wheels of said first axle and said second axle, and to determine vehicle controllability based on at least one measured vehicle controllability value and at least one predetermined target value, and, based on such determination, and to

reduce regenerative braking to all wheels of said first axle while increasing the non-regenerative braking to one wheel of said second axle to maintain the actual vehicle controllability value within the predetermined target value.

Claim 26 (Cancelled)

Claim 27 (new): A system for controlling braking of a vehicle, comprising:

regenerative brakes connected to wheels of a first axle of said vehicle;
non-regenerative brakes connected to wheels of a second axle of said vehicle different from said first axle;
a plurality of sensors for measuring and providing electronic signals to monitor vehicle inputs, comprising at least a steering angle sensor and a brake pedal position sensor;
a controller adapted to continuously receive and process said signals; and
a generator motor activated by said controller for adjustably applying regenerative braking torque to each wheel of said first axle for maintaining a vehicle controllability value within a preselected target range, with said controller maintaining a vehicle controllability value by decreasing regenerative braking on all wheels of said first axle and by preferentially increasing non-regenerative braking on one wheel of said second axle.

Claim 28 (new): A system according to Claim 27, wherein said first axle is a front axle of a vehicle and said second axle is a rear axle of a vehicle.

Claim 29 (new): A system according to Claim 28, wherein said controller increases non-regenerative braking on only the inside wheel of said rear axle.

Claim 30 (new): A system according to Claim 27, wherein said first axle is a rear axle of a vehicle and said second axle is a front axle of a vehicle.

Claim 31 (new): A system according to Claim 30, wherein said controller increases non-regenerative braking on only the outside wheel of said front axle.